

AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior versions of claims in the application.

1. (Currently amended): A reduction device of an industrial robot characterized in a reduction device of an industrial robot having a robot base installed in an XY plane of XYZ orthogonal coordinates, a rotating barrel portion, ~~a rotating shaft and a front/rear shaft~~, rotatably attached to the robot base, and a lower arm of which one end is axially supported by the rotating barrel portion, which is a reduction device of ~~the rotating shaft having~~ an industrial robot including at least one stage of a gear train where a large gear a position of which is fixed to the robot base and a small gear brought in mesh with the large gear and axially supported in the rotating barrel portion are brought in mesh with each other;

wherein the ~~large gear and small gear~~ [[are]] is arranged at a vicinity of a rotational plane of the front/rear shaft by determining an angle of arranging the small gear, centering on a rotating shaft of the large gear within a range in which a circumferential direction backlash amount of the small gear becomes equal to or smaller than that of the large gear in a state of being inclined around an axis, which is connecting rotational centers of the large gear and the small gear in the XY plane owing to an operation of rotating the lower arm, in a state of arranging the small gear such that the axis passing the respective rotational center points of the large gear and the small gear in the XY plane is orthogonal to a plane of operating to rotate the lower arm.

2. (Currently amended): A reduction device of an industrial robot characterized in a reduction device of an industrial robot having a robot base arranged in an XY plane of XYZ orthogonal coordinates, a rotating barrel portion, ~~a rotating shaft and a front/rear shaft~~, rotatably

attached to the robot base, and a lower arm one end of which is axially supported by the rotating barrel portion, which is a reduction device of the rotating shaft having a small gear axially supported by the robot base an industrial robot comprising at least one stage of a gear train at which a small gear axially supported by the robot base and a large gear which is brought in mesh with the small gear and a position of which is fixed to the rotating barrel portion fixed in the rotating barrel portion are brought in mesh with each other;

wherein the large gear and small gear are arranged at a vicinity of a rotational plane of the front/rear shaft is arranged by determining an angle of arranging the small gear centering on a rotating shaft of the large gear within a range in which a circumferential direction backlash amount of the small gear becomes equal to or smaller than a circumferential direction backlash amount when the large gear is inclined around an axis of connecting rotational centers of the large gear and the small gear in the XY plane owing to an operation of rotating the lower arm in a state of arranging the small gear such that the axis passing the respective rotational center points of the large gear and the small gear in the XY plane is orthogonal to a plane of operating to rotate the lower arm.

3. (Currently amended): A reduction device of an industrial robot characterized in a reduction device of an industrial robot having a robot base installed in an XY plane of XYZ orthogonal coordinates, a rotating barrel portion, ~~a rotating shaft and a front/rear shaft, which is the reduction device of the front/rear shaft having a large gear a position of which is fixed to a lower arm of the robot, a small gear brought in mesh with the large gear and axially supported in the rotating barrel portion, and an up/down shaft pivotably supported axially by the lower arm;~~ rotatably attached to the robot base, a lower arm one end of which is axially supported by the

rotating barrel portion, and an upper arm one end of which is axially supported by other end of the lower arm, which is a reduction device of an industrial robot comprising at least one stage of a gear train at which a large gear fixed to the lower arm and a small gear axially supported in the rotating barrel portion are brought in mesh with each other;

wherein the large gear and the small gear are arranged at a vicinity of a plane passing a rotational center axis of the up/down shaft and in parallel with a rotational plane of the rotating shaft is arranged by determining an angle of arranging the small gear centering on a rotating shaft of the large gear within a range in which a circumferential direction backlash amount of the small gear becomes equal to or smaller than a circumferential direction backlash amount when the large gear is inclined around an axis of connecting rotational centers of the large gear and the small gear in the XY plane owing to an operation of rotating the rotating barrel portion in a state of arranging the small gear such that the axis of passing the respective rotational center points of the large gear and the small gear in the XY plane becomes in parallel with a rotating shaft of the rotating barrel portion.

4. (Currently amended): The reduction device of an industrial robot according to any one of the invention claims 1 through 3, characterized in that the gear train of the reduction device is constituted by two stages.

5. (New): The reduction device of an industrial robot according to any one of claims 1 through 3, characterized in that the gear train of the reduction device is constituted by one stage.

6. (New): The reduction device of an industrial robot according to any one of claims 1 through 3, characterized in that a center portion of the large gear includes a communication hole.